

### **REMARKS**

Claims 12 to 15 and 21 to 28 were rejected under 35 U.S.C. §102(b) as being anticipated by WO 01/50477 to Hesketh et al. (hereinafter “Hesketh”). Claims 12 to 15 and 21 to 28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hesketh either alone or in view of either one of U.S. Patent No. 4,652,416 to Millot (hereinafter “Millot”) or U.S. Patent No. 4,326,922 to Ferrari et al. (hereinafter “Ferrari”). Claims 16 to 20 and 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hesketh either alone or in view of U.S. Patent No. 4,224,106 to Delafosse (hereinafter “Delafosse”).

Reconsideration of the application based on the following remarks is respectfully requested.

#### **Interview Summary**

Applicant’s representative Danielle Sullivan (Reg. No. 64,125) contacted Examiner Palabrica on November 12, 2009, regarding the Office Action status. The Office Action dated November 3, 2009 incorrectly listed the Office Action as Final on the Summary page. Examiner Palabrica agreed this was an error and the Office Action dated November 3, 2009 should be Non-Final. Applicant’s thank Examiner Palabrica for his time.

#### **35 U.S.C. §102 Rejections**

Claims 12 to 15 and 21 to 28 were rejected under 35 U.S.C. §102(b) as being anticipated by Hesketh.

Hesketh discloses a “mixed oxide fuel assembly for a nuclear reactor in which the fuel assembly comprises a plurality of fuel rods, a largest diameter fuel rod type, a smallest diameter fuel rod type, and one or more intermediate size fuel rod types being provided.” (Abstract). Hesketh also discloses that “the core may include mixed oxide fuel assemblies and uranium dioxide fuel assemblies.” (Page 5, lines 27 to 28).

Claims 12 and 22 recite in part “the fuel rods containing uranium which is enriched in isotope 235 and not containing any plutonium before the assembly is used in a reactor, wherein the rods are distributed in that least:

a first central group which is constituted by fuel rods which have a first level of nuclear reactivity; and

an outer peripheral layer of fuel rods distributed in:

a second group of fuel rods that extend along faces of the outer contour of the network and that have a second level of nuclear reactivity that is strictly less than the first level of nuclear reactivity; and

a third group of fuel rods that are arranged at corners of the outer contour of the network and that have a third level of nuclear reactivity that is strictly less than the second level of nuclear reactivity.”

In Hesketh, only fuel rods containing plutonium are shown in Fig. 4 which is used to reject claims 12 and 22. (See page 9, lines 1 to 4 and page 7, lines 7 to 8). Where in Hesketh is it shown or disclosed that UO<sub>2</sub> assembly is in a first central group and in a second central group as claimed? The sole mention of non MOX fuel assemblies is at page 5, lines 27 to 28, in which Hesketh states “[t]he core may include mixed oxide fuel assemblies and uranium dioxide fuel assemblies.” Moreover, this in no way indicates that UO<sub>2</sub> fuel assemblies would meet the limitations of claims 12 and 22. Finally, while MOX assemblies are often zoned, no prior art, including Hesketh, teaches or shows zoning UO<sub>2</sub> assemblies as claimed. Thus, Hesketh does not teach or show “fuel rods containing uranium which is enriched in isotope 235 and not containing any plutonium before the assembly is used in a reactor” being “distributed in that least: a first central group which is constituted by fuel rods which have a first level of nuclear reactivity; and an outer peripheral layer of fuel rods distributed in: a second group of fuel rods that extend along faces of the outer contour of the network and that have a second level of nuclear reactivity that is strictly less than the first level of nuclear reactivity; and a third group of fuel rods that are arranged at corners of the outer contour of the network and that have a third level of nuclear reactivity that is strictly less than the second level of nuclear reactivity.” Hesketh only teaches UO<sub>2</sub> assemblies being in the core with the

zoned MOX assemblies and does not teach or suggest any specific distribution for the UO<sub>2</sub> assemblies. (See Hesketh, table 1). Therefore, Hesketh fails to teach or show all limitations of claims 12 and 22.

Withdrawal of the rejection to claims 12 to 15 and 21 to 28 under 35 U.S.C. §102(b) is respectfully requested.

### 35 U.S.C. §103 Rejections

Claims 12 to 15 and 21 to 28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hesketh either alone or in view of either one of Millot or Ferrari.

Hesketh is discussed above.

Millot discloses “a fuel assembly for a pressurized water nuclear reactor consisting of a cluster of parallel fuel rods.” (Col. 2, lines 22 to 24). “[T]he fuel assembly comprises: a peripheral zone consisting of a first group of rods containing mainly uranium oxide enriched in fissile uranium so as to emit neutrons and to maintain the neutron reaction, spaced so that the layer of moderating water is sufficient to bring the neutrons into the thermal region, and a central zone consisting of a second group of rods containing mainly plutonium and/ or uranium depleted in fissile uranium and spaced by a distance which is appreciably smaller than the distance separating the rods in the peripheral zone.” (Col. 2, lines 33 to 44).

Ferrari discloses a composite nuclear fuel assembly “which allows higher coolant operating temperatures and enhanced utilization of mixed-oxide fuels. It also provides a core design flexibility. In one embodiment it provides a vertically oriented assembly of elongated fuel rods of two differing diameters. The upper portion of the assembly includes rods of a smaller diameter than rods of the lower portion of the assembly.” (Col 1, line 65 to col. 2, line 4).

Claims 12 and 22 recite in part “a second group of fuel rods that extend along faces of the outer contour of the network and that have a second level of nuclear reactivity that is strictly less than the first level of nuclear reactivity; and a third group of fuel rods that are arranged at corners of the outer contour of the network and that have a third level of nuclear

reactivity that is strictly less than the second level of nuclear reactivity.”

As discussed above, in Hesketh, only fuel rods containing plutonium are shown in Fig. 4 which is used to reject claims 12 and 22. (See page 9, lines 1 to 4 and page 7, lines 7 to 8). Where in Hesketh is it shown or disclosed that  $\text{UO}_2$  assemblies are in a first central group and in a second central group as claimed? The sole mention of non MOX fuel assemblies is at page 5, lines 27 to 28, in which Hesketh states “[t]he core may include mixed oxide fuel assemblies and uranium dioxide fuel assemblies.” Moreover, this in no way indicates that  $\text{UO}_2$  fuel assemblies would meet the limitations of claims 12 and 22. Finally, while MOX assemblies often are zoned, no prior art, including Hesketh, teaches or shows zoning  $\text{UO}_2$  assemblies as claimed. Thus, Hesketh does not teach or show “fuel rods containing uranium which is enriched in isotope 235 and not containing any plutonium before the assembly is used in a reactor” being “distributed in that least: a first central group which is constituted by fuel rods which have a first level of nuclear reactivity; and an outer peripheral layer of fuel rods distributed in: a second group of fuel rods that extend along faces of the outer contour of the network and that have a second level of nuclear reactivity that is strictly less than the first level of nuclear reactivity; and a third group of fuel rods that are arranged at corners of the outer contour of the network and that have a third level of nuclear reactivity that is strictly less than the second level of nuclear reactivity.” Hesketh only teaches  $\text{UO}_2$  assemblies being in the core with the zoned MOX assemblies and does not teach or suggest any specific distribution for the  $\text{UO}_2$  assemblies. (See Hesketh, table 1). Furthermore, neither Millot nor Ferrari teach or show the limitations discussed above, nor does the Office Action assert they do.

Withdrawal of the rejection to claims 12 to 15 and 21 to 28 under 35 U.S.C. §103(a) is respectfully requested.

Claims 16 to 20 and 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hesketh either alone or in view of Delafosse.

Claims 16 to 20 and 29 are directly and indirectly dependent on claim 12. In light of discussion above regarding claim 12, withdrawal of the rejection is respectfully requested.


**CONCLUSION**

It is respectfully submitted that the application is in condition for allowance and applicants respectfully request such action.

If any additional fees are deemed to be due at this time, the Assistant Commissioner is authorized to charge payment of the same to Deposit Account No. 50-0552.

Respectfully submitted,

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